



Welcome to the
March 27, 2008

Kentucky Wireless Interoperability
Executive Committee Meeting

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Open Meeting

- Introductions / Roll Call





Old Business

- Discussion/Approval of Minutes
- Chairperson's Report

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Chairperson's Report

Chuck Miller

The logo for the University of Kentucky is positioned at the bottom center of the slide. It features the word 'Kentucky' in a large, white, cursive script font. To the right of the word is a white silhouette of a horse's head in profile, facing right, with a red and blue mane. Below the word 'Kentucky' and the horse head, the words 'UNBRIDLED SPIRIT' are written in a smaller, white, all-caps, sans-serif font. A small 'TM' trademark symbol is located at the bottom right of the horse head graphic.

What is the KWIEC?

- Established in 2003 by **KRS 11.5161**
- Definitions clarified by **KRS 11.5162**
- Responsibilities are listed in **KRS 11.5163**
 - Establish and implement a statewide public safety interoperability plan
 - Evaluate and recommend all wireless communications architecture, standards, and strategies
 - Provide direction, stewardship, leadership, and general oversight of information technology and information resources
 - Report annually on progress and activity by agencies of the commonwealth to comply with standards to achieve public safety communications interoperability
 - Serve as the advisory body for all wireless communications strategies presented by agencies of the Commonwealth and local governments
 - Makes recommendations to the chief information officer, the Governor's Office for Policy and Management, and the General Assembly
 - Develop funding and support plans that provide for the maintenance of, and technological upgrades to, the public safety shared infrastructure



Who makes up the KWIEC?

Twenty one (21) members legislated by KRS 11.5163 are assigned

Name	Representing
Steve Dooley	Chair - Appointed
Rick Boggs	Office of Infrastructure Services, COT
Ken Mitchell	Office of the 911 Coordinator
Michael Clark	Kentucky Educational Television
Jon Clark	Transportation Cabinet
Don Pendleton	Justice and Public Safety Cabinet
Brad Bates	Department of Kentucky State Police
Robert Milligan	Department of Fish and Wildlife Resources
Marvin Terry	Environmental and Public Protection Cabinet
Rodney Hayes	Division of Emergency Management, DMA

Name	Representing
Mary Pedersen	Kentucky Office of Homeland Security
Melba Story	Department for Public Health, Cabinet for Health and Family Services
Mike Rosenstein	Council on Postsecondary Education
Lonnie Lawson	The Center for Rural Development
*	Municipal Government
*	County Government
Michael Ward	Municipal Police
Terry Lewis	Local Fire Department
Boston Hensley	County Sheriff Department
Charles O' Neal	Local EMS
*	Local 911 Dispatch Center

* Seat is in transition

KWIEC Support

The KWIEC is supported by:

- Dedicated Facilitator
- Two Permanent Working Groups
 - Architecture and Standards
 - Public Safety
- Ad-Hoc Working Groups as needed



All groups are comprised of subject matter experts in wireless communications from a variety of agencies including

- Justice
- The Center for Rural Development
- Department of Military Affairs
- Emergency Management
- Metro Louisville
- Commonwealth Office of Technology

KWIEC Mandates

The KWIEC has three major mandates (by KRS)

- 1. Establish and Implement a Statewide Public Safety Interoperability Plan*
- 2. Evaluate primary State and local Wireless Public Safety Voice and Data Communications Project Plans*
- 3. Develop Funding and Support Plans that provide for the maintenance and technological upgrades to the Public Safety Shared Infrastructure (KEWS)*

Mandate 1

Establish and Implement a Statewide Public Safety Interoperability Plan

- Lead by KWIEC member - Mary Pedersen
- Additional support was provided by subject matter experts from:
 - COT
 - KSP
 - DMA
 - Others
- This is a living document and is an on-going effort



Mandate 2

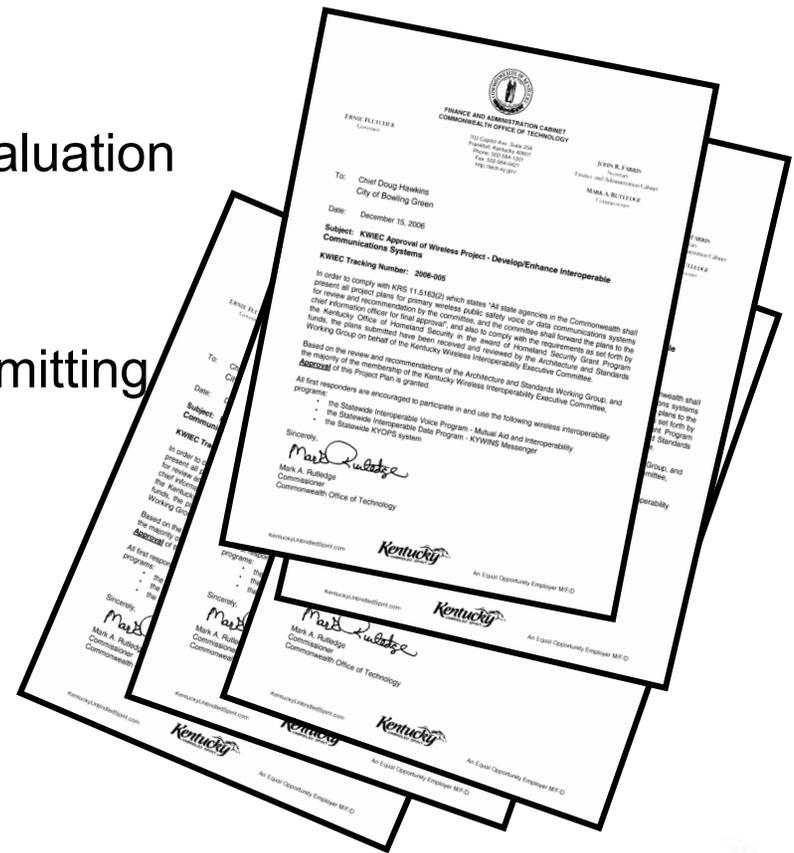
Evaluate primary State and local Wireless Public Safety Voice and Data Communications Project Plans - 2007

57 Project Plans were submitted for evaluation in CY 2007

5 Project Plans were withdrawn by submitting agencies

51 Project Plans were approved

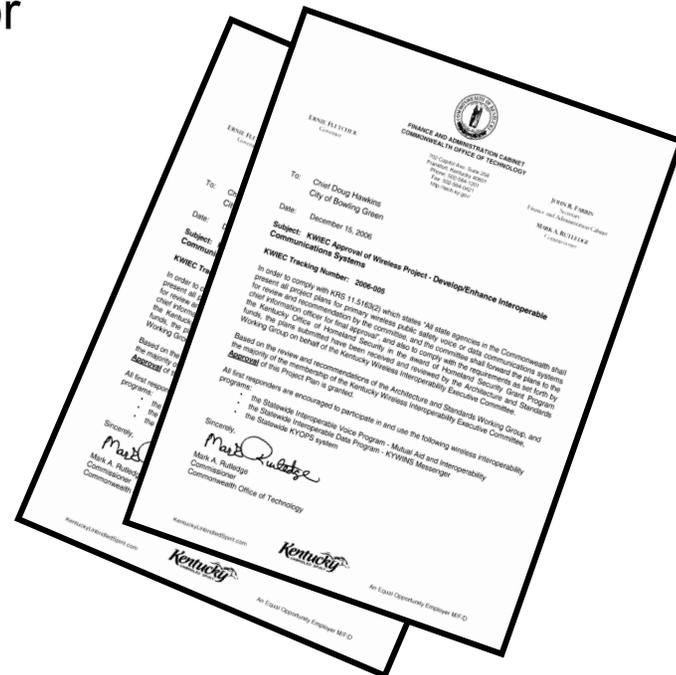
1 Project Plan was disapproved



Mandate 2 (cont)

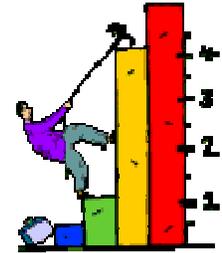
Evaluate primary State and local Wireless Public Safety Voice and Data Communications Project Plans - 2008

- 9 Project Plans have been submitted for evaluation in CY 2008 so far
- 6 Project Plans were approved
- 3 Are in evaluation by the ASWG



Original KWIEC Goals for 2007

The KWIEC had five major goals carried into 2007



1. Completion of the Mobile Data Project
2. Completion of the Voice Mutual Aid and Interoperability Project
3. Pursuit of a strategic initiative for the exchange of wireless data among public safety agencies (KYWINS Messenger)
4. Participation in the SAFECOM Pilot Project
5. *Upgrade the Eastern half of the Kentucky Emergency Warning System (KEWS)*

KWIEC Rearticulated Goals 2007

1. Continue efforts to improve statewide Interoperability for public safety
2. Install all of the new Digital Microwave systems in the Eastern Segment of the Kentucky Emergency Warning System (KEWS)
3. Increase public awareness and utilize outreach programs to promote Public Safety and Communications Interoperability effort

Recommended KWEIC goals for 2008

1. Continue efforts to improve statewide interoperability programs for public safety
2. Complete the upgrade of the KEWS Eastern Segment
3. Increase public awareness and utilize outreach programs to promote public safety and the communications interoperability effort
4. *Review, fine tune, and publish the long term Strategic plan for communications interoperability for the Commonwealth*

Thank You

Questions



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Strategic Communications Plan

Mary Pedersen





Strategic Communications Interoperability Plan
Mary Pedersen
Chief Information Officer





Strategy: Kentucky will implement a strategy that requires identifying a baseline of public safety communications across the Commonwealth, leveraging existing efforts to improve communications and interoperability, and building a backbone that enhances interoperability statewide.



Near-Term Initiatives

- 1. Enhance State Voice Mutual Aid System:** Provide additional infrastructure for added channel capacity within the existing mutual aid frequency bands.
- 2. Complete the KEWS Upgrade:** Complete all civil work, radio and network equipment installation and testing, and move all communications traffic to the KEWS digital microwave network.
- 3. Streamline 911 Dispatch Services:** Network all PSAPS across Kentucky
- 4. Implement Strategic Technology Reserve:** Deploy seven new Mobile Communication Centers and upgrade existing KSP Mobile Command Vehicles.



Long-Term Initiatives

- 1. Achieve Close to 100% Statewide Coverage:** Identify baseline of statewide communications to include inventory of local communications assets. Expand coverage by improving and constructing infrastructure-inventory, categorize and prioritize “dead spots.”
- 2. WiMAX:** Deploy WiMAX or other high speed solution across the KEWS microwave digital network. Solution will replace the current IPMobileNET solution as Kentucky’s primary public safety data network. IPMobileNET will be sustained for use as a secondary network in the more deeply penetrated areas and as the primary network for agencies outside the WiMAX net.



PSIC Grant Status

- **Submitted State Strategy on December 3, 2007**
- **Received independent review results March 2008**
- **Submitted requested modification**
- **Final review by March 31, 2008**
- **Funds available???? APRIL 2008**



For more information, please contact

Mary Pedersen

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Mary.Pedersen@ky.gov



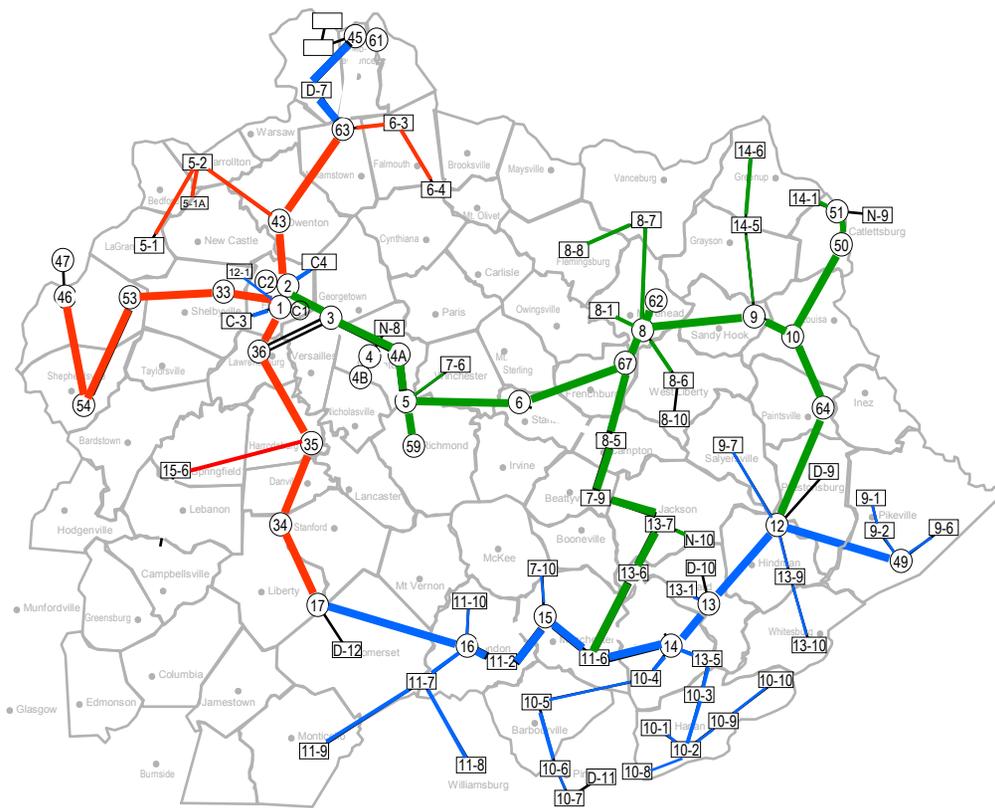
KEWS Digital Upgrade Project

Jeff Mitchell



KWIEC – Original 2007 Goal

Upgrade the Eastern half of the Kentucky Emergency Warning System (KEWS)



Project Approach

This project was undertaken to upgrade Kentucky's 30 year old public safety infrastructure.

A three-phased project approach is being used

1. Engineering –

- Conduct site surveys for 141 sites

2. Eastern Implementation - Upgrade sites in the East (88 sites)

- Complete Network Engineering for the Eastern sites
- Strengthen Towers
- Upgrade Grounding & Electrical Service
- Upgrade Generator and Battery Plant
- Replace selected Shelters
- Replace Microwave dishes
- Upgrade to Harris 5000 and 6000 series microwave radio systems

3. Western Implementation - Upgrade sites in the West (53 sites)

- Procure Funding
- Complete Network Engineering for the Western sites
- Implement upgrades (Same as the East)



Supported Agencies

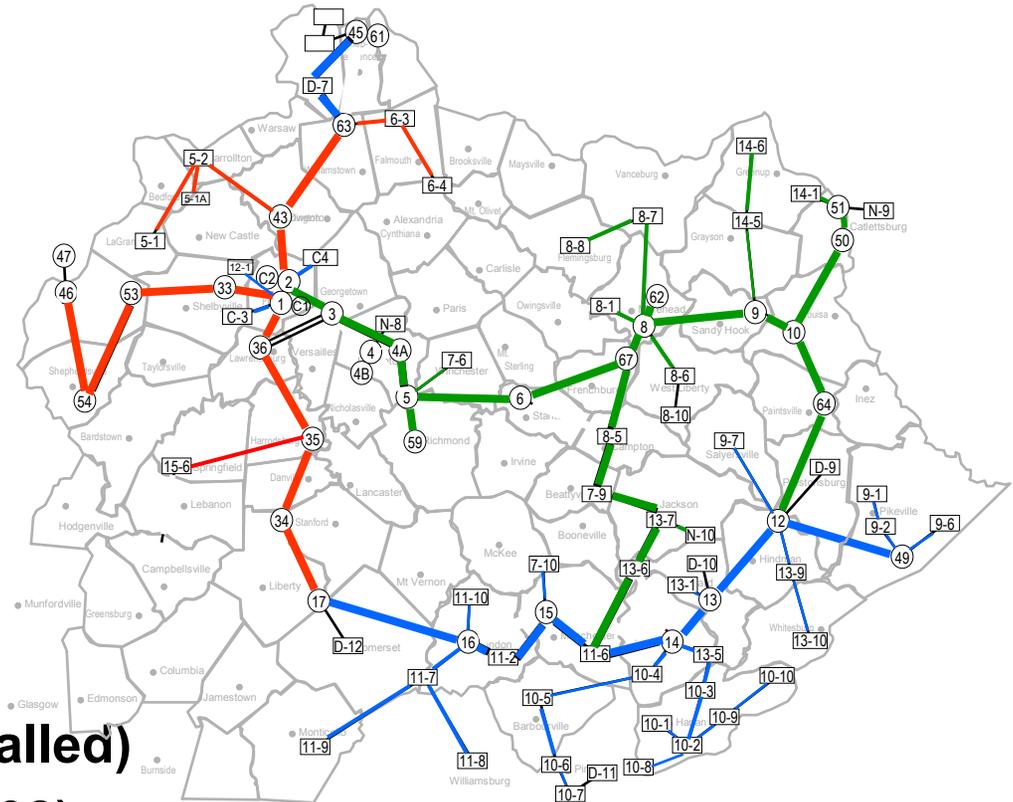
The following agencies will directly benefit from this upgrade

- Kentucky State Police
- Kentucky Education Television
- Kentucky Vehicle Enforcement
- National Oceanic and Atmospheric Administration
- Department of Military Affairs
- Kentucky Emergency Management
- Federal Bureau of Investigation
- United States Secret Service
- Army Corps of Engineers
- Department of Fish and Wildlife
- Department of Highways
- Eastern Kentucky Power
- Forestry Service
- University of Kentucky - Medical Center
- Eastern Kentucky University
- Hundred of local first responder agencies (911, Emergency Management Services, Sheriff, Police, and Fire departments)



Current Status – In progress

- Antenna Systems
 - Installation **99%**
 - Remove Old Antennas **7%**
- Back-Up Power
 - **P1** and **P2 (Installed)**
 - **P3 (Q2 - 2008)**
- Digital Equipment
 - **P1** and **P2 Installation (Installed)**
 - **P1** and **P2 Testing (Q2 - 2008)**
 - **P3 Installation and Testing (Q3 - 2008)**



Typical Site - Before and After upgrade



Before

- ← No Generator
- ← Damaged Poly Shelter
- ← Tower at load limits



After

- Expanded compound →
- Reinforced tower and guy lines →
- New bullet resistant aggregate shelter →
- Improved road to hilltop →
- 43KW Emergency Generator →

Tangible Benefits Now!

Benefits

This site located at New Bernheim Forest was isolated by the recent ice storm (2008). As a result of this upgrade the following benefits were realized:

- No call out was required and no KEWS technician needed to risk life or limb to get to this site during the storm
- The emergency Generator system worked flawlessly and kept this site fully operational for two days without commercial power
- After the weather cleared three techs worked for 16 hours using chainsaws to get to the site
- Absolutely **NO** communications outage occurred!



Benefits - After Upgrade

- Provide a guaranteed 99.9996% RF link reliability rate across the network (multi-path outages of less than 90 seconds per year)
- Reduce user downtime by using the automated reroute capabilities of MPLS
- Provide improved circuit quality to customers (Typically First responders)
- Provide improved services to end users
- Provide additional link cross-connections between key sites (minimizes multi-hop traffic)
- Provide additional bandwidth (>400% of current capacity)
- Provide a statewide digital microwave network using MPLS technology
- Provide remote monitoring and management of all equipment deployed in the new network
- Provide bandwidth to meet current requirements and allow for greater than a 50% growth
- Create new and detailed site records for all KEWS sites (tower, rack face elevations, power, grounding, structural, etc.)
- Provide improved security and equipment protection at selected sites
- Provide upgraded grounding and power in selected areas
- Provides direct support to communications convergence (VoIP, etc.)
- Provide redundancy at key sites not previously protected

Thank You





Operational Statewide RF Networks

Kentucky State Police

Mutual Aid

Mobile Data

Fish and Wildlife

Forestry

Department of Transportation

Military Affairs

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Question to Agencies

- “If the Commonwealth had a major disaster and the Governor needed to press your RF networks into service what would he have to work with?”



Operational Statewide RF Networks

Kentucky State Police

Mutual Aid

Mobile Data



Kentucky State Police Voice and Data Systems



Derek Nesselrode, Chief Engineer

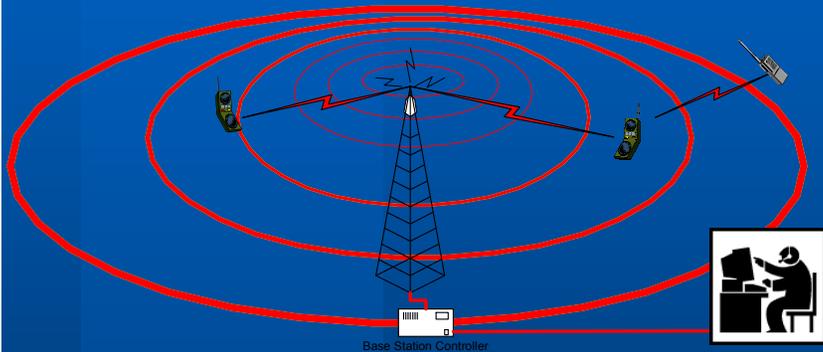
Voice System Overview

Kentucky State Police UHF P25 Digital Radio Communications System:

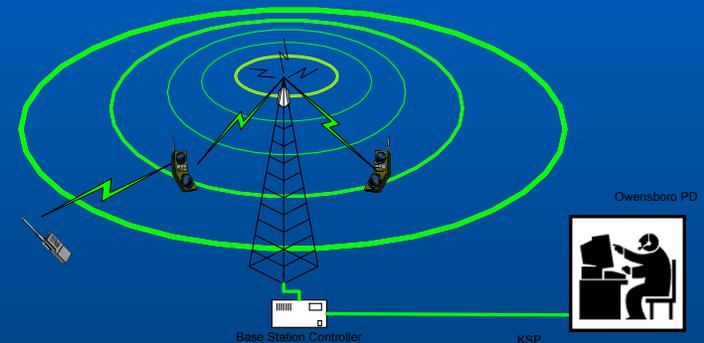
- 107 Fixed Uhf Radio Tower Sites on the KEWS microwave
- digital multicast system for maximum mobile coverage and redundancy
- 1250 Mobile Radio Units
- 57 Consolidated Dispatch Positions
- UHF, VHF and 800Mhz Mutual Aid radio infrastructure, using nationally recognized frequencies.

Mutual Aid Interoperability

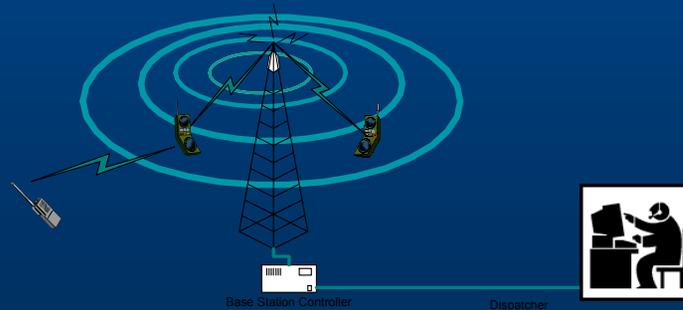
Three Mutual Aid Networks are available for use independently or can be patched together



150 MHz Band

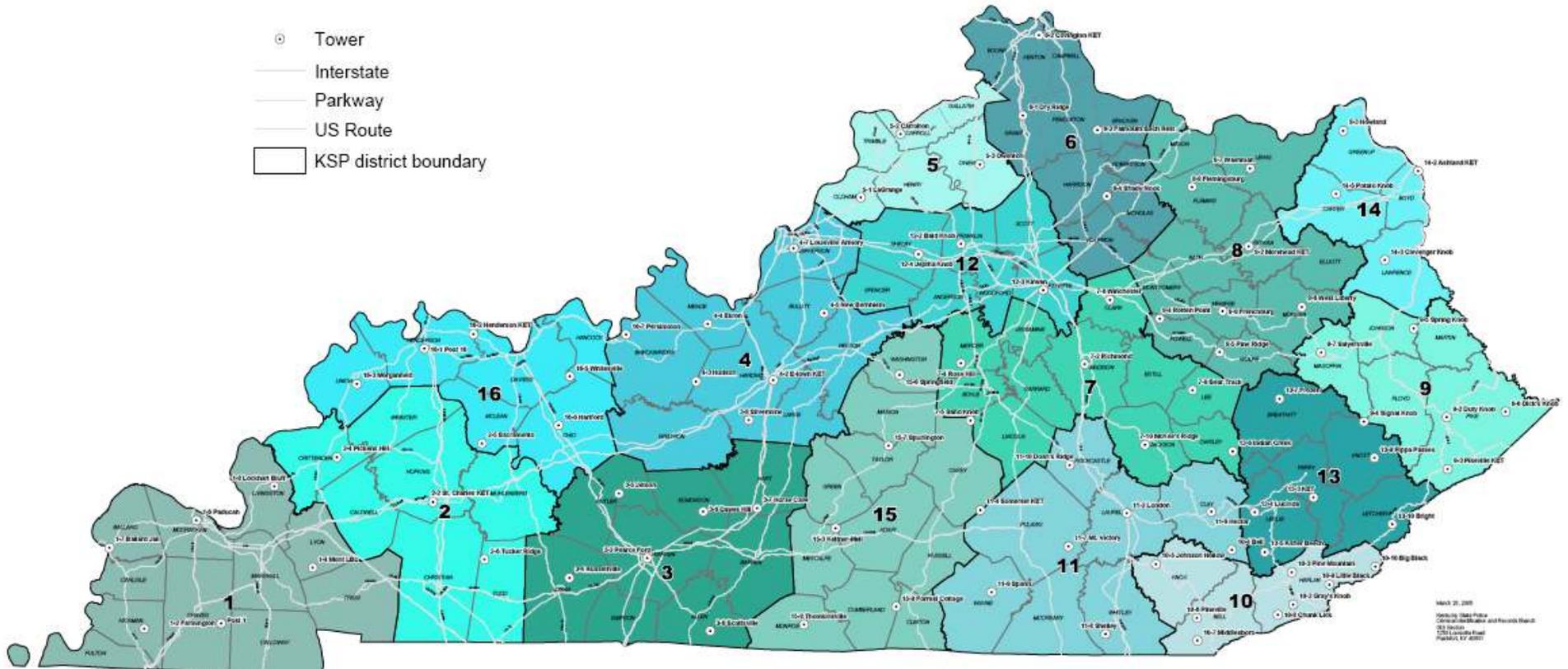


450 MHz Band



800 MHz Band

- ⊙ Tower
- Interstate
- Parkway
- US Route
- ▭ KSP district boundary

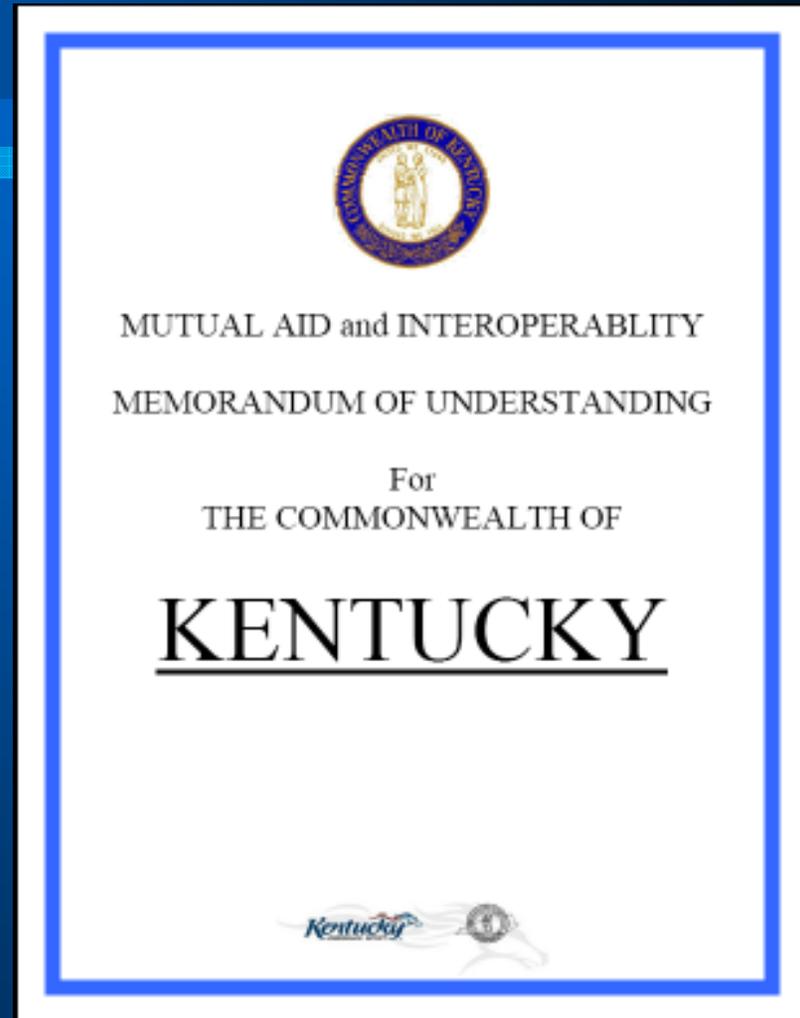


March 21, 2008
 Version: 0808-01-01
 Created: 08/08/08 and Revised: 03/08/08
 08/08/08
 0731 Lincoln Road
 Fairfax, VA 22031

The Mutual Aid Regions are aligned with the KSP Posts to take advantage of the Statewide dispatch capability already present.

Participation

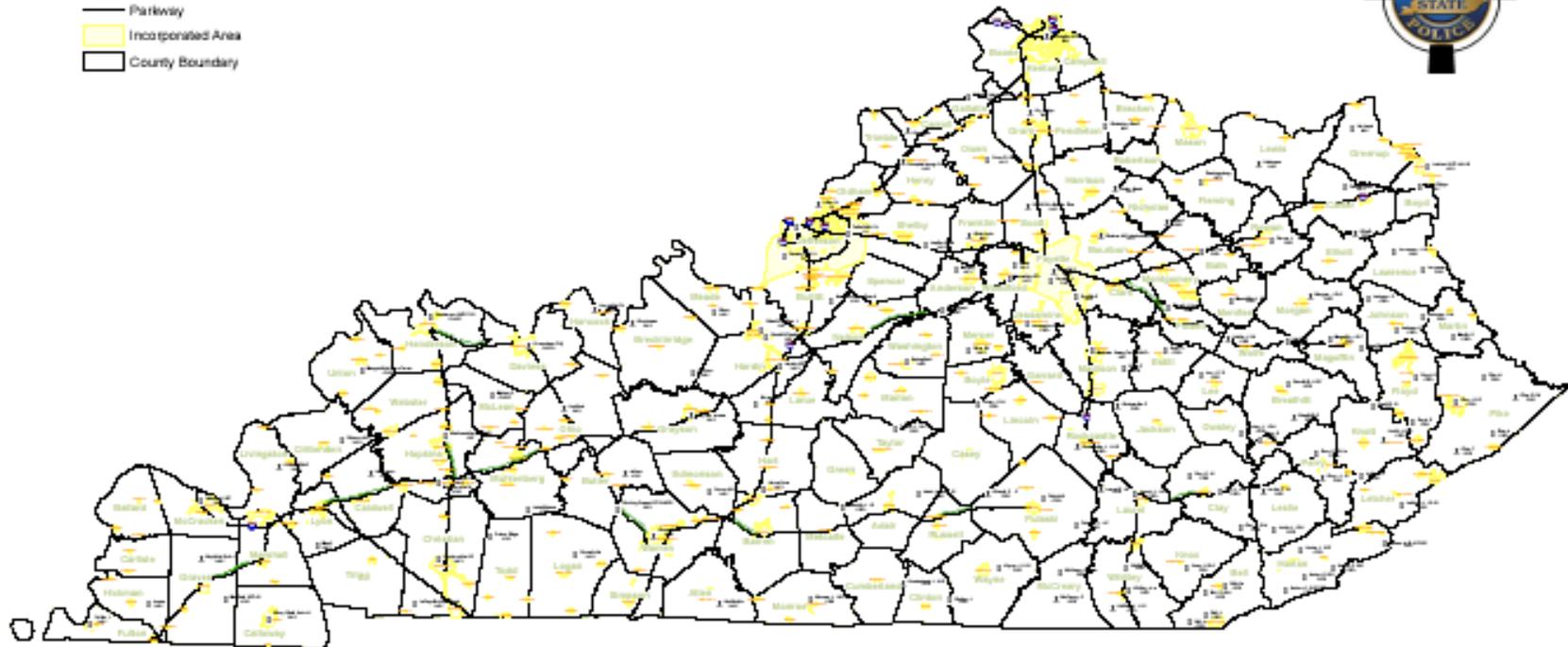
1. Download this MOU from www.kwiec.ky.gov/interoperability.
2. Fill it out completely and have it signed by the senior person in the Agency.
3. Return it to the address provided.
4. Check the website after ten working days to ensure that your agency has been added to the approved agency list.
5. Once you see your name on the list, program the radios with the Mutual Aid frequencies you desire.



Mobile Data System

Kentucky Wireless Data Communication Infrastructure Antenna Tower Locations

- Antenna Tower
- Interstate
- Parkway
- Incorporated Area
- County Boundary



Maping Source: County boundaries derived from the Kentucky Information Authority

Source: KY State Police
August 17, 2009

Operational Statewide RF Networks

Fish and Wildlife



Kentucky Department of Fish and Wildlife Resources



System Design

- Conventional VHF system
- Statewide capabilities with Central Dispatch in Frankfort
- 24/7 operation
- Inquiry only
- 32 towers on GOT microwave network

Communication System

- Serves 141 Field Officers
- 5w Kenwood TK 280&290 Portable Radios
- 100 watt Kenwood Mobiles
- 100 watt Vehicle Repeaters
- 50 boats equipped with mobile radios
- All radios programmable to any VHF frequency
- Marine Band Radios
- 35w Kenwood Canned Radios



Improvements

- CAD
- MDT/MDC
- The addition of electronic messaging would greatly improve communications
- Additional towers on the fringes would help communications on the Ohio River.

Questions?

- Lt. Mike Fields
mike.fields@ky.gov
502-564-3400



Operational Statewide RF Networks

Forestry



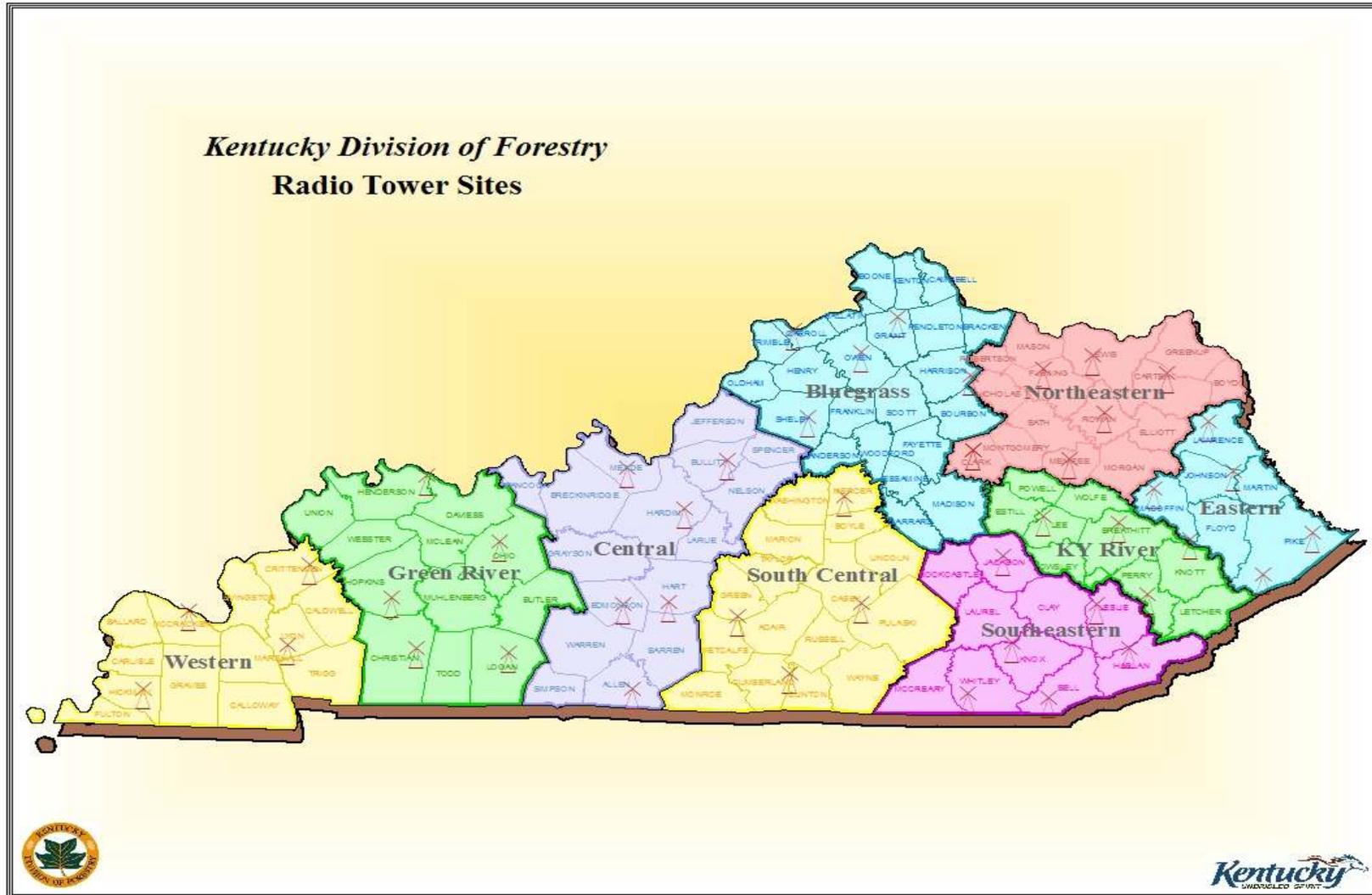
Kentucky Division of Forestry

- VHF 12.5 kHz and 25 kHz high-band repeater system with 46 repeaters
- Both narrow and wide band with scan ability
- Programmable 64 channel mobiles and 128 channel hand held radios
- Three mutual aid frequencies and one fire compact frequency

Kentucky Division of Forestry

- Six tactical channels for each district
- Three USFS frequencies
- Five weather frequencies

Site Locations & Coverage



Equipment Summary

Radios

150 MHz

- 387 Handheld radios
(HD1250 128 channel)



- 427 Mobile radios
(CDM 1250 64 channel)



Base Station MTR2000

- 46 Repeaters



Issues

- **Major issues – need for more repeaters limited by lack of available frequencies**
- **Possible change from multicast system (multiple frequencies in each district) to a simulcast system (one frequency in each district)**

Operational Statewide RF Networks

Department of Transportation



Operational Statewide RF Networks

Military Affairs



Department of Military Affairs Emergency Communication Systems



CW4 David Barker
Wireless IT Manager

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Background

- The Department of Military Affairs consist of the Kentucky National Guard and State Emergency Management.
- The J6/CIO is responsible for providing emergency communications for disaster response.
- Our capabilities are to provide voice, data, and video to our first responders as well as the onsite Incident Commander

SYSTEMS

- Department of Military Affairs Radio Communication System (DMARCS)
- National Guard Mobile Command Vehicle (NGMCMV)
- Emergency Management Mobile Command Vehicle (EMMCMV)
- Joint Incident Site Communications Capabilities (JISCC)
- Mobile Communication Tower
- Deployable communications

Department of Military Affairs Radio Communications System



System Design

The DMARC System is based on a Digital Narrowband Multicast Encrypted platform consisting of 53 radio repeater sites.

These sites are positioned around the thirteen State Emergency Management Areas and are interlinked through the KEWS microwave system to the dispatch consoles in Frankfort.

DMARCS Users

State

Department of Military Affairs

- State Emergency Management
- Kentucky National Guard
- WMD 41st CST
- Civil Air Patrol CAP

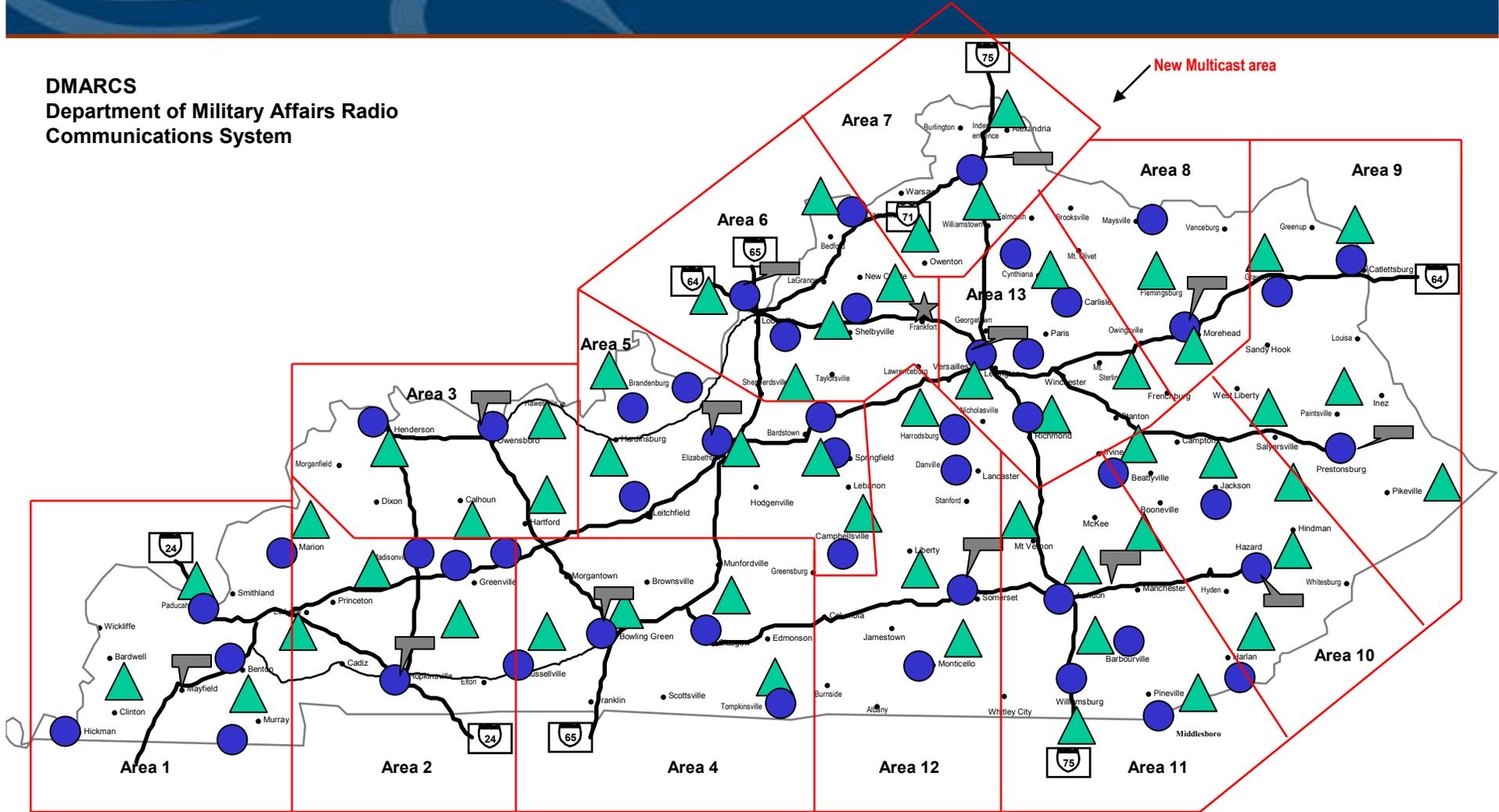
Fire Marshall Office

Department of Natural Resources Health Services

County

- EM DIRECTORS
- 14 Regional HAZMAT Response Teams

DMARCS
Department of Military Affairs Radio
Communications System



-  Armories 52 radios
-  VHF high-band repeater sites 53
-  KyEM Area Offices

©2005 Commonwealth of Kentucky



Equipment Summary

DMARCS equipment

- **139-143 MHz**
 - 53 VHF Quantar Repeaters
 - 5 CRT Consoles
 - 55 VHF Base stations
 - 265 Portables
 - 50 Mobiles



National Guard Mobile Command Vehicle



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NGMCMV Equipment Summary

Data and Video

- VSAT
- IP phones and Laptops
- VTC capabilities
- Share server
- Fax capabilities
- Secure phone/fax
- Tower camera
- Air to ground Video
- 4 Sat TV receivers
- 2 DVD recorder/Player
- Video Modulators

Radio

- VHF Quantar Repeater
- 50 portable radios
- ACU 1000 link to 2 VHF, 2 UHF and 2 800MHz mobile radios
- Air to ground radio uhf/vhf
- HF radio PRC 150
- SINCGARS mil radio
- 3 VHF mobile radios for dispatch services
- 800 MHz IP MobileNet









Emergency Management Mobile Command Vehicle





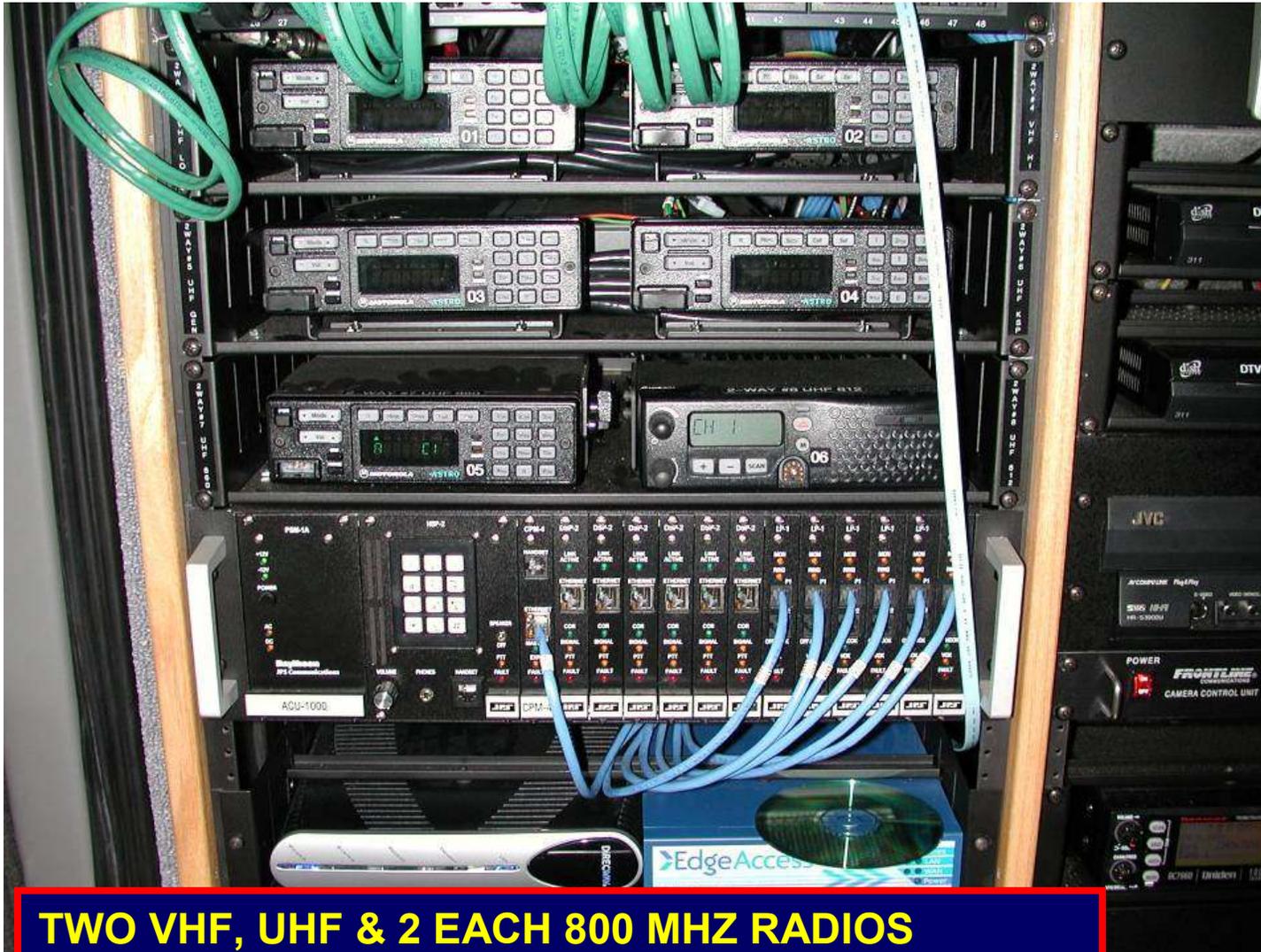
EMMCV Equipment Summary

Data and Video

- VSAT
- IP phones and Laptops
- VTC capabilities
- Share server
- Fax capabilities
- Tower camera
- 2 Sat TV receivers
- 1 DVD recorder/Player
- Wireless Access Point
- HF Winlink Data

Radio

- VHF Kenwood Repeater
- 20 VHF portable radios
- 5 UHF portable radio
- 2 800 portable radios
- ACU 1000 link to 2 VHF, 2 UHF and 2 800MHz Mobiles
- Air to ground radio VHF AM
- 2 HF HAM Kenwood TS570
- 3 VHF/UHF HAM Dual Band
- 2 VHF mobiles
- 1 UHF mobile radio
- Sat Radio (Mitubishi)
- 800 MHz IPMobileNet
- CB Radio



**TWO VHF, UHF & 2 EACH 800 MHZ RADIOS
ACU1000 BELOW RADIOS**

ANTENNA COAX PATCH PANEL & CAMERA TV



**STREETSIDE VHF & UHF RADIOS PLUS WEATHER STATION
ALL WHITE SURFACES ARE DRY ERASE**



DISH NETWORKS TV IN CONFERENCE ROOM



CURBSIDE HAM/MARS OPERATIONS STATIONS



Joint Incident Site Communication Capabilities





JISCC Equipment Summary

Data and Video

- VSAT
- 25 IP phones
- 15 Laptops
- VTC capabilities
- Share server
- 2 printer/fax/scanners
- 1 Sat TV receiver
- Wireless LAN

Radio

- 1 UHF EF Johnson Repeater
- 25 UHF EF Johnson portable radios
- RIOS link to 2 VHF, 2 UHF and 2 800MHz mobile radios
- Air to ground radio uhf/vhf



Mobile Communication Tower



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Mobile Communication Tower

110 ft cable driven mast
1 VHF Quantar Repeater
1 UHF Quantar Repeater
Trailer mounted Shelter
12kw Diesel Generator





©2005 Commonwealth of Kentucky





Deployable Communication System



Deployable comms

4 VHF Mobile repeaters

1 UHF Mobile Repeater

20 Iridium Satellite phones

15 MSAT terminals (EM)

2 BGAN terminals (JISCC kits)

ACUT and ACU1000

2 ICRI one 5 channel and one 2 channel

2 IMBITR radios 30-512 MHz

LOC equipment (NGB controlled)

300 BK VHF portable radios

3 VHF Repeater

3 VHF Base stations

100 Iridium Satellite Phones (no service)

Issues

- **Issue: No ability to monitor DMARCS site failures.**
- **Solution: Implement a Fault Management Control System**
- **Concern- Without this capability we can't monitor outages of radio sites. If this happen during a emergency our users would be without communications for a critical amount of time.**
- **System would not only service our system but also the Interoperability and KSP systems.**

Issues

- **Issue: Some users have non P25 radios that won't work on our system**
- **Solution: Funding for State Fire Marshall Office and Natural Resources office to purchase new radios**
- **Concern- No communication with EOC during an emergency event**

Issue

- **ISSUE: INTEROPERABILITY EXERCISE PLAN**
- **SOLUTION: PLAN AND EXECUTE MULTI-JURISDICTION COMMUNICATIONS EXERCISES**
- **CONCERN: STATE, FEDERAL AND LOCAL JURISDICTIONS REQUIRE PLANNERS AND C2 FOR EXERCISES TO ENHANCE THEIR ABILITY TO CONDUCT INTEROPERABLE COMM OPERATIONS.**

Questions?



Thank You

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New Business

- Adopt Goals for 2008?
- Open Discussion

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Adopted Goals for 2008

1. Continue efforts to improve statewide interoperability programs for public safety
2. Complete the upgrade of the KEWS Eastern Segment
3. Increase stakeholder awareness and utilize outreach programs to promote public safety and the communications interoperability effort
4. Publish and begin implementation of the long term Strategic plan for communications interoperability for the Commonwealth

Open Discussion





Adjournment

- Closing Remarks
- Upcoming Events

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